REVIEW OF THE WEEK

The world inside the head

In a new book on the human brain the author's gaze ranges from the atomic to the ineffable, finds **Christopher Martyn**

There's a widespread belief that biology can best be understood at the level of molecular interaction. Although the website of the UK Medical Research Council (MRC) proclaims that it gives a high priority to research that is likely to make a real difference to clinical practice and the health of the population, it spends the lion's share of its budget on molecular and cellular research. That this is the right thing to do goes virtually unchallenged. Five years ago the House of Commons Science and Technology Committee published a highly critical report of the workings of the MRC, forcing George Radda, then its chief executive, into making the memorable excuse that "with hindsight we should have had more foresight." But the committee was criticising the way in which the budget was administered rather than how the money was spent.

However, even if we put aside doubts about whether the bodies that fund medical research have achieved the right balance between basic biology and questions relevant to the care of patients, it's surely a mistake to think that focusing on the minutest levels is the best way to reveal the workings of complicated systems. No economist wanting to make sense of global markets would think the way forward was to study the behaviour of individual shoppers. No one wanting to get to grips with how computers worked would start with the physics of semiconductors. A worm's eye view doesn't always provide a useful perspective. Adapting a metaphor invented by the neurobiologist Steven Rose, a visiting Martian wanting to make sense of a page of the *BMJ* wouldn't make much progress if it concentrated its efforts on a chemical analysis of the paper and ink.

The human brain is a complicated machine, by any standards. Some versions of it (Newton's, Mozart's or Einstein's, for example) can do breathtakingly clever things, but even the standard issue is pretty impressive. Despite the fact that the brain's remarkable abilities must ultimately reside in the movement of molecules across membranes, it doesn't follow that by studying these things we shall understand how it works.

Adam Zeman clearly realises this, and the strength of his book is how it ranges from the atomic to the ineffable. He has structured it as a series of different levels, starting at the smallest, a molecule of oxygen, and then increasing in size and complexity through subcellular organelle, nerve cell, neuronal networks, and brain regions. He ends ambitiously with mind and consciousness.

At the same time, each chapter tells the story of a patient: a young woman disabled by feelings of exhaustion, or a middle aged man with a compulsion to collect discarded objects, for example. These stories aren't case reports in any medical sense. They have little clinical detail and concentrate more on the patients' subjective feelings than on the features that might help a neurologist arrive at a diagnosis. But the device works well in giving a counterpoint to the neuroscientific explanation. The description of local neural networks, for instance, gains immediacy and relevance by being centred on the stories of two patients who experienced distortions of memory: a young woman with déjà vu and an astronomer who has an episode of transient global amnesia.

Philip Larkin famously thought that sexual intercourse began in 1963, and many biologists have a similar idea—not about sex, of course, but about their subject, which they think began 10 years earlier in 1953 when the structure of DNA was worked out. Zeman doesn't share this delusion. He knows that the history of the scientific investigation of the nervous system stretches back a long way, and he appreciates the huge conceptual advances made by men such as Santiago Ramón y Cajal and Charles Sherrington in the 19th century and early 20th century. Another strength of the book is the way these earlier contributions are successfully incorporated into an entirely modern, if rather incomplete, account of neuroscience.

As the book unfolds it manages to convey something of the texture of the author's everyday life as a working clinician. We hear him complaining that the NHS doesn't allow him enough time for each patient; at the end of a clinic he is getting tired and looking forward to a holiday; he beats himself up over a missed diagnosis. It's not exactly warts and all, but it feels honest and uncontrived. His enthusiasm for neurology and his fascination with the workings of the nervous system come across clearly.

It's really this that makes the book worth reading. Rather few books are written about work—and why people do the jobs they have chosen and the effect that it has had on them.

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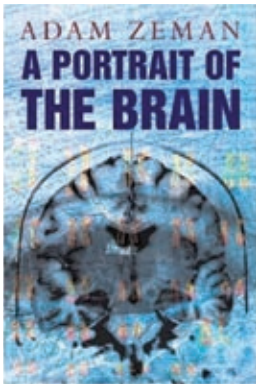


A Portrait of the Brain
Adam Zeman
Yale University Press, £18.99, pp 246
ISBN 978 030 011416 4
Rating: ★★★☆

Some brains can do breathtaking clever things, but even the standard issue is pretty impressive

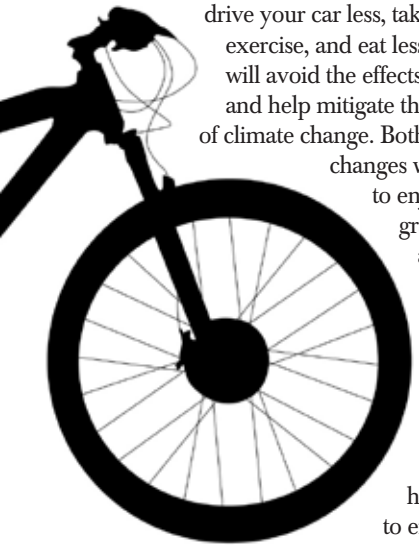
Why should doctors be interested in climate change?

PERSONAL VIEW **Mike Gill**

The Royal College of Physicians of London's report *Smoking and Health* was published in 1962, but 45 years passed before smoking was banned in enclosed public places in England. We have a small fraction of that time to cap carbon emissions globally to avoid serious risk of irreversible climate change (www.ipcc.ch/ipccreports/ar4-syr.htm). Smoking cessation has long been a recognised, legitimate, clinical aim—yet personal carbon footprint reduction is not. Why not?

Health professionals were powerful catalysts to society changing its view about smoking. Smoking is no longer seen as a normal lifestyle choice, but an addiction that has harmful effects not just for the individual but for others. Most of us do not yet think of our high carbon lifestyle as an addiction that is more destructive than tobacco, and irreversibly so.

We have not yet developed the professional attitudes, language, or conceptual framework needed to make it easy and legitimate to tackle this addiction in the clinical setting. Just as doctors smoked in front of patients, many of us still drive to work in large cars. But there are strong echoes from the challenges posed by tobacco control—if you stop smoking by 35, your risk of harm and life expectancy return to normal within a few years, and nobody else is exposed to your smoke. If you drive your car less, take more exercise, and eat less meat, you will avoid the effects of obesity and help mitigate the effects of climate change. Both sets of changes will help you to enjoy your grandchildren, and if you reduce your carbon footprint your grandchildren will have a planet to enjoy.



Imagine that all doctors in the United Kingdom halved their car driving and flying, reduced energy consumption at their workplace by 20%, halved their meat consumption, and enthused 10 colleagues each year to reduce their carbon footprint by 5%. Imagine also that every general practitioner persuaded three patients a week to halve their driving and meat consumption and catalysed increases in fuel efficiency in 10 homes a year. What would the net effect on carbon emissions be?

Under certain assumptions the reduction might be 2-4 million tonnes of CO_2 a year, against an estimated annual footprint for the NHS in England of 18 million tonnes and a total in the United Kingdom of around 600 million tonnes (www.sd-commission.org.uk/publications/downloads/NHS_Carbon_Emissions_modelling1.pdf and www.climateandhealth.org/getinformed/ten_practical_actions). Of this, the biggest single component comes from the energy industry (all industries involved in the production and sale of energy). We are committed to reductions of at least 60% by 2050, and it has become clear that they need to be greater still (*Nature* 2008;452:531-2). Rapid and profound changes in behaviour are needed.

Arguably, the most recent equivalent "health emergency" in the UK was the arrival of the HIV epidemic in the 1980s. That justified mass action at every level—setting up a government awareness campaign that included shock tactics on the television, establishing national surveillance of the effects of behaviour and the behaviour itself, earmarking of funds, and rapidly accepting that this was a problem that demanded the attention of health professionals.

What is different about climate change? After all, as with HIV in the 1980s, no cure is available at a global level for the effects of high carbon behaviour; people who are already the most vulnerable in society are affected most; and we know how to tackle the problem.

One crucial difference exists, though. When health professions recognised the need for action to tackle HIV, it was not public infrastructure that was responsible for the spread of the virus. In contrast, public infrastructure and government policy are responsible for controlling CO_2 emissions.

Just as doctors smoked in front of patients, many of us still drive to work in large cars

So, whatever part health professionals can play in helping to change behaviour at the individual level, collective resilience requires collective action, as for example with immunisation. Even nations with a more libertarian political philosophy than the UK disallow school entry for children who have not completed their immunisations. One of those nations, the United States, is responsible for the highest per capita CO_2 emissions in the world. Although such examples may not seem related to those of tackling climate change, the underlying principles are entirely generalisable.

In the short time before the UN conference on climate change in Copenhagen in December 2009 we need to encourage governments and the international community to join up what we know, think, and do if we are to succeed in meeting the emission reduction targets vital to our survival. In practice, this means that firstly we should initiate a stepwise change in our focus on reducing health threats related to high carbon lifestyles—mainly obesity, injuries from road crashes, and seasonal deaths. We should be doing much better on these anyway. Secondly, we should show ourselves, our patients, and our politicians how seriously we are taking the challenge, and how much more seriously we would take it if governments showed the necessary determination to get international agreement to a global carbon cap at Copenhagen.

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Competing interests: MG is co-chair of the Climate and Health Council, a not for profit organisation that aims to mobilise health professionals to take action to tackle cimate change.

Ibsen's medical classic, p 1509

Ten practical steps for doctors to fight climate change

PERSONAL VIEW **Jenny Griffiths, Alison Hill, Jackie Spiby, Robin Stott**

The effects of climate change on health are already here, from increasing food prices to floods. Doctors led the charge on tobacco—we must do the same for climate change.

It is the defining issue for health in the 21st century. By reducing our greenhouse gas emissions as health professionals, as well as citizens, we will also prevent disease.

The world is close to the critical thresholds of two degrees of global warming and 450 ppm (parts per million) of carbon dioxide equivalent emissions. We have 5-10 years to stabilise emissions to prevent catastrophic climate change. This requires action now.

Each person in the UK is directly responsible for about 10 tonnes of carbon emissions a year, divided evenly between energy consumed in buildings; transport (including one tonne on air travel); food production, distribution, and retailing; and consumption of goods and services other than food. About half of these emissions come from the home, and half from work and community infrastructure.

Our priorities require little money. Most mean that we, and our patients, will spend less, and they have the additional merit of improving wellbeing. Here are 10 practical actions.

1. Inform ourselves about the basic science of climate change, the health benefits of taking action, and the urgency of doing so.
2. Advise our patients. Better diet and more walking and cycling will improve their health and reduce their carbon emissions.
3. Use less energy ourselves (and reduce costs) by more insulation in the roof, walls, and floors; turning off appliances and lights; and, where possible, reducing use of goods and services.
4. Drive the car less; fly less; walk or cycle more; use public transport; drive an efficient car; share cars; hold meetings by teleconference, videoconference, or webcasting; attend fewer international conferences.
5. Influence food menus wherever we go—ask for local food, less meat, and less processed food; a low carbon diet is a healthy diet. Drink tap water.
6. Advocate locally, especially in primary care, to maximise home insulation and uptake of relevant grants.
7. Advocate for personal carbon entitlements within an equitable, fair shares global framework, such as Contraction and Convergence.
8. Advocate to stabilise population—by promoting literacy and promoting women's access to birth control, through the International Planned Parenthood Federation (www.ippf.org) or Marie Stopes International (www.mariestopes.org.uk).
9. Be a champion: put climate change on the agenda of all meetings—clinical teams, committees, professional networks. Doctors can tip opinion with chairs and chief executives.
10. Gear up your own influence and that of all health professionals by joining the Climate and Health Council (www.climateandhealth.org) or the Health and Sustainability Network (www.healthandsustainability.net), or both.

We have calculated, using modest assumptions, that the medical profession collectively could reduce carbon emissions by 5 million tonnes a year by acting on these suggestions. This is equivalent to the annual carbon emissions of half a million people in the UK.

Advising patients on lower carbon diets and walking and cycling instead of car travel would have a large impact. If three patients a week reduced their carbon emissions from food or car travel by just 5% as a result of information from general practitioners, each GP could save 15 tonnes of carbon per year, and also benefit health. Doctors are still the professionals that the public trusts most. And the impact year on year would be cumulative.

Globally 22% of greenhouse gas emissions are caused by livestock production.

Meat consumption in high income countries is four times higher than in low income countries. Halving meat consumption to 90 g/day/person would benefit health. In the UK, one third of food is wasted.

Every doctor could reduce their own carbon emissions by 5-10% by driving 5000 miles per year in a car with a fuel economy of 60 mpg (rather than the average of 10 000 miles with a fuel economy of 30 mpg). Reducing air travel by half would save another 5% of average personal carbon emissions. Across the population, these four changes would do much to stabilise carbon dioxide equivalent emissions below the critical 450 ppm threshold.

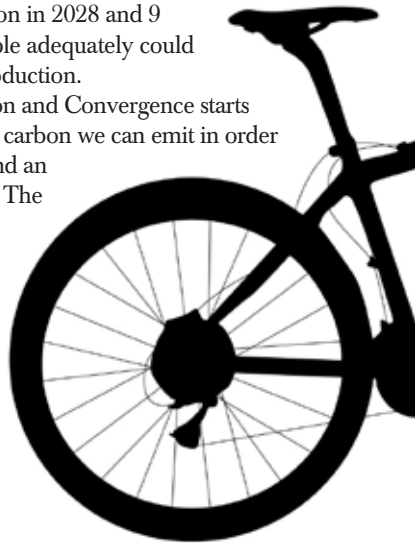
The medical profession could help to prevent perhaps 100 000 tonnes of carbon emissions by advocating successfully for home insulation in just 10 local households, which would also help reduce excess winter deaths. Authoritative international advice emphasises the cost effectiveness of insulation. The insulation and heating improvements schemes promoted through UK councils have variable uptake, despite rapidly rising fuel poverty.

The world population was 2.5 billion in 1953, is 6.7 billion now, and is projected as 8 billion in 2028 and 9 billion in 2050. Feeding 9 billion people adequately could require a massive increase in food production.

The global framework of Contraction and Convergence starts with a science based calculation of the carbon we can emit in order to keep CO_2 levels below 450 ppm, and an equal entitlement of this to each adult. The framework enables development and health improvement for the world's poorest people (www.gci.org.uk).

Doctors must advocate for stabilising world population and for an equitable global framework for carbon control.

Jenny Griffiths, Alison Hill, and Jackie Spiby are at the Health and Sustainability Network; Robin Stott is is at the Climate and Health Council.



A golden syrup

FROM THE FRONTLINE
Des Spence

Much of my working life is spent listening to confessions. For example, someone with diabetes might say, "I have the occasional KitKat; I'm so sorry, doctor." Medicine's denunciation of paternalism is but a sham, for we now attempt to micro-manage every detail of patients' lives, through medications and health promotion diktats. But this clearly isn't working.

People with type 2 diabetes fare the worst. Their diagnosis is now an absolute. The term "mild diabetes" has long been retired to the graveyard of defunct terminology, along with "nervous disability" and "rodent ulcer." Also, we have lowered the threshold for diagnosis, and the meaningless term "prediabetes" stalks some 54 million people in the United States. Diabetes is now a big problem—but an even bigger business.

Then start the horror stories of blindness, dialysis, amputations, and heart attacks—terror tactics used in the name of compliance. Next come the medications—statins, aspirin, and ACE inhibitors, for a start. Impossible blood pressure targets lead to multiple antihypertensives, and patients are soon on the full house of poisonous polypharmacy. But lowering glycated haemoglogin (HbA_{1c}) is considered the key, with initial combinations of oral antiglycaemics and now with the widespread use of insulin. All are based on the observational data of the United Kingdom prospective diabetes study and the belief that lowering HbA_{1c} reduces complications.

But two recent prospective interventional studies on tight glycaemic control—ACCORD (*N Engl J Med* 2008;358:2545-59) and ADVANCE (*N Engl J Med* 2008;358:2560-72)—challenge this faith system. Not only did lower HbA_{1c} not statistically reduce cardiovascular complications, but it increased all cause mortality. How could this possibly be? In medicine we measure what is measurable—and this makes us blind to the many immeasurable unknowns that confound even the most obvious of associations. Mere association is not causation, so high blood sugar may merely be a symptom of yet undiscovered metabolic pathways.

Have we been wasting our time? Type 2 diabetes is an illness of affluence, not a medical epidemic. In attempting to micro-manage the detail we have lost sight of the obvious. Tackling obesity and type 2 diabetes is a macro-management and public health problem. Until there is political will to build an infrastructure that forces people to be more active and gives incentives for better diets, I fear more time will be spent in the health confessional.

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Placenta tales

THE BIGGER PICTURE
Mary E Black

My oldest baby tucks her mobile phone into her handbag and heads off to the disco. Fourteen years ago she was still a bump under my jumper, attached by umbilical cord and placenta. The bump, the placenta, and I were booked in for a home birth but took a tour of the London Hospital (I like back-up plans). We met another couple who were determined to give birth chanting on all fours and with yoga breathing (they didn't; they had a caesarean) and to ritually bury the placenta under a sapling in East London's Victoria park (they did).

The placenta (from the Latin for cake and the Greek plaokenta, meaning flat) is a dinnerplate sized, knotty-fleshed ephemeral organ that is rarely mentioned in polite, or indeed any, company in the West. Most mothers cannot even tell you what their placenta looks like; it is whisked away after birth to a communal bin and incineration. Yet Maori bury the placenta to emphasise the link between the baby and the earth. The Nepalese think of the placenta as the baby's friend; Malaysian Orang Asli regard it as the baby's older sibling. In Nigeria the Ibo conduct full funeral rites for what they see as the baby's twin. Native Hawaiians traditionally plant the placenta with a tree, which can then grow alongside the child.

Placentophagia has a long history. Experts in traditional Chinese medicine have documented the practice for more than 2500 years. For a rather weird Western variant, a list of placenta recipes from the September 1983 edition of *Mothering Magazine* is doing the rounds on the web. Placenta lasagne, anyone?

Some hospitals still sell placentas in bulk for scientific research, or to cosmetics firms, where they are processed and later plastered on the faces of rich women. In the UK, babies are gently wiped dry, leaving some protective vermix clinging to the skin. In contrast, in eastern Europe vermix is scrubbed off the newborn's skin with soap, water, and stiff brushes. The babies are then plonked—shocked, swaddled, and painfully pink—into communal nursery bassinets. This cruel practice and can lead to hypothermia.

As for that other East London placenta? I missed the burial in Victoria Park but went along the next day to relive the moment with our friends. We stood with our tiny babies in a hushed semicircle round a large empty hole in the flowerbed. "Perhaps you should have asked the park keeper first?" said one young mother helpfully. Deep down we all knew the more likely explanation. I can see them now, a bunch of rollicking local dogs, chasing each other past pensioners on park benches, their unbelievable prize tossed high.

Some placentas are born to run.

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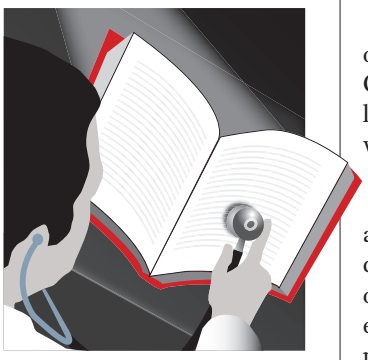
In with the wrong crowd

BETWEEN THE LINES
Theodore Dalrymple



Lamb had not had the opportunity to read the recent papers in the *British Journal of Psychiatry* concerning the white matter defects in the frontal lobes of pathological liars

As Oscar Wilde so justly observed, work is the curse of the drinking classes. No one would have agreed more heartily than Charles Lamb, the essayist and friend of the Romantics. He hated his work in the offices of the East India Company and thought that it all but destroyed his literary gifts. When his office superior upbraided him for always arriving late at work, he replied, "Yes, sir, but to make up for it I always leave early."

In his *Last Essays of Elia*, he wrote his Confessions of a Drunkard. There can hardly be a doctor in practice, at least in the United Kingdom, who does not recognise the truth of its opening assertions: "Dehortations from the use of strong liquors have been a favourite topic of sober declaimers of all ages, and have been received with abundance of applause by water-drinking critics. But with the patient himself, the man that is to be cured, unfortunately their sound has seldom prevailed."

Having a partiality both for drink and, like most men, for himself, Lamb tells us that drinking is not a vice like any other.

Other vices, such as stealing and lying, are easy to abjure, unlike drinking: "the hand to pilfer, and the tongue to bear false witness, have no constitutional tendency. At the first instance of the reformed will, they can be brought off without a murmur."

Alas, Lamb had not had the opportunity to read the recent papers in the *British Journal of Psychiatry* concerning the white matter defects in the frontal lobes of pathological liars, nor to read the theory of forensic psychologists concerning the highly addictive nature of car theft.

But why did Lamb drink too much (if he did), or, as he put it himself, "commence sot?"

He was a friend of Coleridge, and Coleridge's problems with drink were at least as important as his better publicised, and also self publicised, problem with opium. This, however, were so much more romantic than the strong liquors that had been the favourite topic of sober declaimers of all ages. In fact, descriptions of Coleridge's symptomatology suggest the effect of drink more than that of drugs (see *BMJ* 2008;336:451). The same goes for another of the Romantics, De Quincey.

Lamb's explanation for the development of his own intemperance is simple. It is precisely what we have all heard a hundred times from the mouths of heroin addicts: he fell in with the wrong crowd: "About that time I fell in with some companions of a different order. They were men of boisterous spirits, sitters up a-nights, disputants, drunken: yet seemed to have something noble about them."

Lamb threw over these friends, but not his drinking. Unfortunately, Lamb's next set of friends introduced him to a new vice, as difficult to abjure as drink: "I should repel my readers, from a mere incapacity of believing me, were I to tell them what tobacco has been to me, the drudging service which I have paid, the slavery which I have vowed to it."

And all this in the first quarter of the 19th century, without the tobacco companies having to mislead him about the addictive nature of their product.

Theodore Dalrymple is a writer and retired doctor

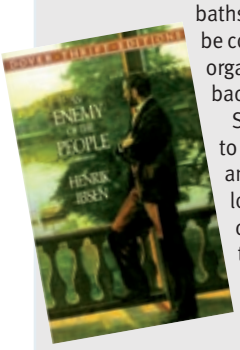
MEDICAL CLASSIC

An Enemy of the People By Henrik Ibsen

First published 1882

An Enemy of the People could have been subtitled *A medic against the majority*. A damning indictment of bourgeois complacency, it was partly a response to criticism of Ibsen's 1881 play *Ghosts*, which had scandalised contemporaries with its portrayal of a case of congenital syphilis in a well to do family. The furious reaction of both the conservative and liberal press to *Ghosts* was to Ibsen evidence of moral hypocrisy latent in late 19th century society. It provoked him into writing *An Enemy of the People*, which dramatises the unthinking reaction of the masses when confronted with uncomfortable medical truths.

Set in a town on the southern coast of Norway, the play opposes the courage of a local doctor with the spinelessness of those who surround him. Dr Tomas Stockmann is medical officer of the town's recently opened baths and a prominent figure in the community. The baths were something of a family project, devised and overseen by Stockmann and his brother Peter, the town mayor and chief of police. As summer approaches, many visitors are expected, drawn to the town by the healing properties of the baths. But the prosperity this is set to bring is imperilled when Stockmann reveals to his brother and a local newspaper editor that he has carried out research showing the baths to be "a sink of disease . . . a tremendous health risk." He explains how he has made "the most conscientious investigation possible," fuelled by concerns over the high number of water borne conditions found in visitors to the baths, and has found the water to be contaminated by decomposing organic matter and vast quantities of bacteria.



Stockmann is initially encouraged to make this information public and prepares a report for the local press, confident that his conclusions will be accepted by the local townspeople. When, however, it becomes clear that the problem cannot be easily overcome without large public expenditure, Stockmann's findings meet with widespread opposition. Increasingly disaffected, Stockmann launches a fierce attack on the systems and authorities that control decision making in the town: "the swamp where the whole of our public life lies rotting." Shunned by the local newspaper and unwilling to change his stance in return for a peaceful outcome, he attempts to deliver his findings at a public meeting, which turns into a riot as the townspeople group together and refuse to hear him, denouncing him as "an enemy of the people."

Ibsen's antipathy to contemporary morality speaks through almost all of his plays. It found a particular target in the hypocrisy of the time towards uncomfortable medical truths. Ibsen himself seems to have felt something of Stockmann's isolation, as is articulated at the end of play: "The strongest man in the world is the man who stands most alone."

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